



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/696,232	10/26/2000	Mitsuru Ishikawa	07553.0017	5127
22852	7590	06/22/2006		
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413				
			EXAMINER OLSEN, ALLAN W	
			ART UNIT 1763	PAPER NUMBER

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/696,232

**Applicant(s)**

ISHIKAWA ET AL.

**Examiner**

Allan Olsen

**Art Unit**

1763

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **Detailed Action**

#### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 1, 2006 has been entered.

#### ***Response to Arguments***

Applicant's arguments filed March 1, 2006 (see pages 4-8) have been fully considered and are persuasive. Therefore, the previous rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as was set forth in the advisory action of March 30, 2006.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 1763

**Claims 1-4 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,284,149 issued to Li et al. (hereinafter, Li).**

Li teaches a method of etching a layer of BCB (16, 20) that overlies a SiO<sub>2</sub> etch stop layer (18) (see abstract). BCB is the cured polymer of divinyl siloxane-benzocyclobutene. BCB contains SiO<sub>2</sub>, C and H and has a dielectric constant of less than 3 (see figure 4 and column 4, lines 1-17). Li teaches etching the BCB with plasma derived from a gas mixture comprising C<sub>4</sub>F<sub>8</sub> and N<sub>2</sub> (see column 10, line 21 - column 11, line 35). Li teaches a patterned resist (42, 44) overlies the BCB (see: figure 5, 6, 17 or 18; column 7, lines 21-31).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li.**

The above noted teachings of Li are herein relied upon. Additionally, it is noted Li teaches that Dow Chemical, the manufacturer of BCB, recommends etching BCB with a plasma comprising CF<sub>4</sub>/Ar (column 4, lines 40-44).

Li does not teach adding Ar to the etchant when etching BCB.

It would have been obvious to one skilled in the art to add Ar to the etchant of Li because the manufacturer of BCB recommends adding Ar to a fluorocarbon etchant and adding an inert gas diluent such as argon, which is a common practice in plasma processing, provides a number of benefits including greater process control.

**Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of US Patent 6,455,411 issued to Jiang et al. (hereinafter, Jiang).**

The above noted teachings of Li are herein relied upon. Additionally, it is noted that Li teaches that Dow Chemical, the manufacturer of BCB, recommends etching BCB with a plasma comprising CF<sub>4</sub>/Ar (column 4, lines 40-44).

Li does not teach etching BCB with a mixture of CF<sub>4</sub> and N<sub>2</sub>.

Jiang teaches that CF<sub>4</sub> and C<sub>4</sub>F<sub>8</sub> or a mixture of the two may be combined with N<sub>2</sub> to etch an organic silicate (Column 3, line 27 - column 4, line 13).

It would have been obvious to one skilled in the art to use CF<sub>4</sub> in addition to or in lieu of the C<sub>4</sub>F<sub>8</sub> to etch the silicon-containing organic material of Li because Jiang teaches that C<sub>4</sub>F<sub>8</sub> and CF<sub>4</sub> are functionally equivalent with respect to etching a silicon-containing organic material. It would have been obvious to use a N<sub>2</sub>: CF<sub>4</sub> ratio of between 1:1 and 4:1 because Jiang teaches using an etchant with an N<sub>2</sub>: CF<sub>4</sub> ratio within this range and it is considered obvious to optimize process parameters such as flow rates.

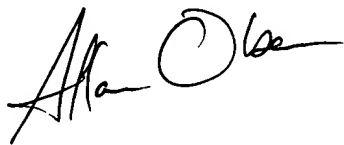
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M, W and F: 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read "Allan Olsen", with a stylized flourish at the end.

Allan Olsen  
Primary Examiner  
Art Unit 1763